Publicity

- "Friends of Nomad" list that went out with information packets
  - Newspapers, TV stations
  - All NASA centers
  - Thousands of people around the world
- Acknowledgment in paper(s)
- Web Site
- Familiarity within RI

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Status

- IMU is on Nomad and being used for position estimation and the antenna pointing.
- We talked to Greg Stockley 2 months back regarding software and will give them the software once it is fully tested.
- BEI has been advertised as one of our primary friends/sponsor.
- Greg Stockley has been kept updated on any developments of IMU.
- There has been no publications on IMU so far. Once we get enough results, we will coauthor a paper with BEI.
- We got more familiar with BEI and are in a better position to incorporate their sensors.

Equipment Status

Equipment Proposed:

12 Encoders, 6 Potentiometers, 3 IMUs, 6 Motors

Equipment Asked For:

1 IMU, 1 Encoder, 2 Potentiometer

Status:

- IMU being used for orientation estimates
- Encoder not used due to change in requirements.
- Potentiometer not used due to mechanical difficulty in accommodating them into the linkage.

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IMU Status

IMU is on Nomad and being used for orientation estimates.

- Rate sensors are very good- accurate and fast response time.
- Provides high bandwidth update that allows smooth antenna pointing.
- Unlike Compass, doesn't get affected by magnetic field due to motors and computers.
- Even a simple merging on the compass and IMU gives accurate, clean data.
- BEI is interested in co-authorship of papers. We will write a paper after we get more results.

Whats CMU upto?

Or other opportunities to incorporate BEI sensors...

- Atacama Desert Trek
- Antarctic Meteorite Search
- Chernobyl- Nuclear Cleanup Robots
- Automated Forklifts (Ford)
- Automated of mining (Joy mining)
- Automated Construction (CAT)
- Automated Harvesting (New Holland)
- Medical Robotics (need miniature, accurate sensors)
- Autonomous Helicopters
- ...

Applications (1 of 2)

Internal Safeguarding of Robots

(BEI products: encoders, inclinometers, potentiometers)

- **detect extreme/limiting conditions**

Precision Mechanism

(BEI products: Motors, encoders, potentiometers)

- **Antenna Pointing Mechanism**
- **Tabletop Factory**
- **Electronics Assembly Robots**

...

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Applications (1 of 1)

Tracking and Stabilization

(BEI products: IMU, encoders)

- Antenna pointing from robots
- Optical communication
- Sensor stabilization
- Antenna pointing from ships
- Active Vision
- Target designation and weapon tracking

Position/Orientation Estimation

(BEI product: IMU, inclinometers, encoders)

- Almost all mobile robots, esp. indoor mobile robots (no GPS)
- Stereo- Image correspondence